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TITLE: Geologic Structure Detection by High Resolution Seismic Reflection Methods Near the Custer Hill Landfill

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13. ABSTRACT ***(Maximum 200 Words)***

A seismic reflection survey was undertaken to detect geologic faults near the Custer Hill landfill at Fort Riley, Kansas. The survey was terminated after initial testing revealed that shallow seismic reflection was not an appropriate technique for the site.

14. SUBJECT TERMS Shallow seismic reflection surveying

15. NUMBER OF PAGES 12

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Table of Contents

The University of Kansas

Don W. Steeples
Department of Geology

September 13, 2000

Commander
Directorate of Environment and Safety
ATTN: AFZN-ES Blgdg. 407
Fort Riley, Kansas 66442-6016

ATTENTION OF Ms. Janet Wade:

This is a final technical report for our contract #DAMD17-99-2-9053 with your office. As per my discussions with Mr. Mike Green of your office last autumn and also a couple of weeks ago, our seismic reflection efforts at Custer Hill landfill failed. We tried all of the filter capabilities in our arsenal of processing software, including frequency-wavenumber filtering and frequency-amplitude filtering.

Attached are some representative seismograms from the testing that was done. We used a sledgehammer, a 30.06 rifle, and an 8-gauge Betsy Seisgun as seismic sources. We performed experiments at Well CH91-10 and Well CH99-11, but results were negative at both locations even though we used all of the experimental parameters that we could think of to try.

The final invoice has been sent, and the total cost was something less than $4,000, a small fraction of the $18,542 that was authorized.

I am sorry that this project did not provide the answers that you need to help solve the problems at the Custer Hill landfill. If you have questions, let me know.

Sincerely,

Don W. Steeples
McGee Distinguished Professor of Geophysics
The University of Kansas

Attachments: (8)

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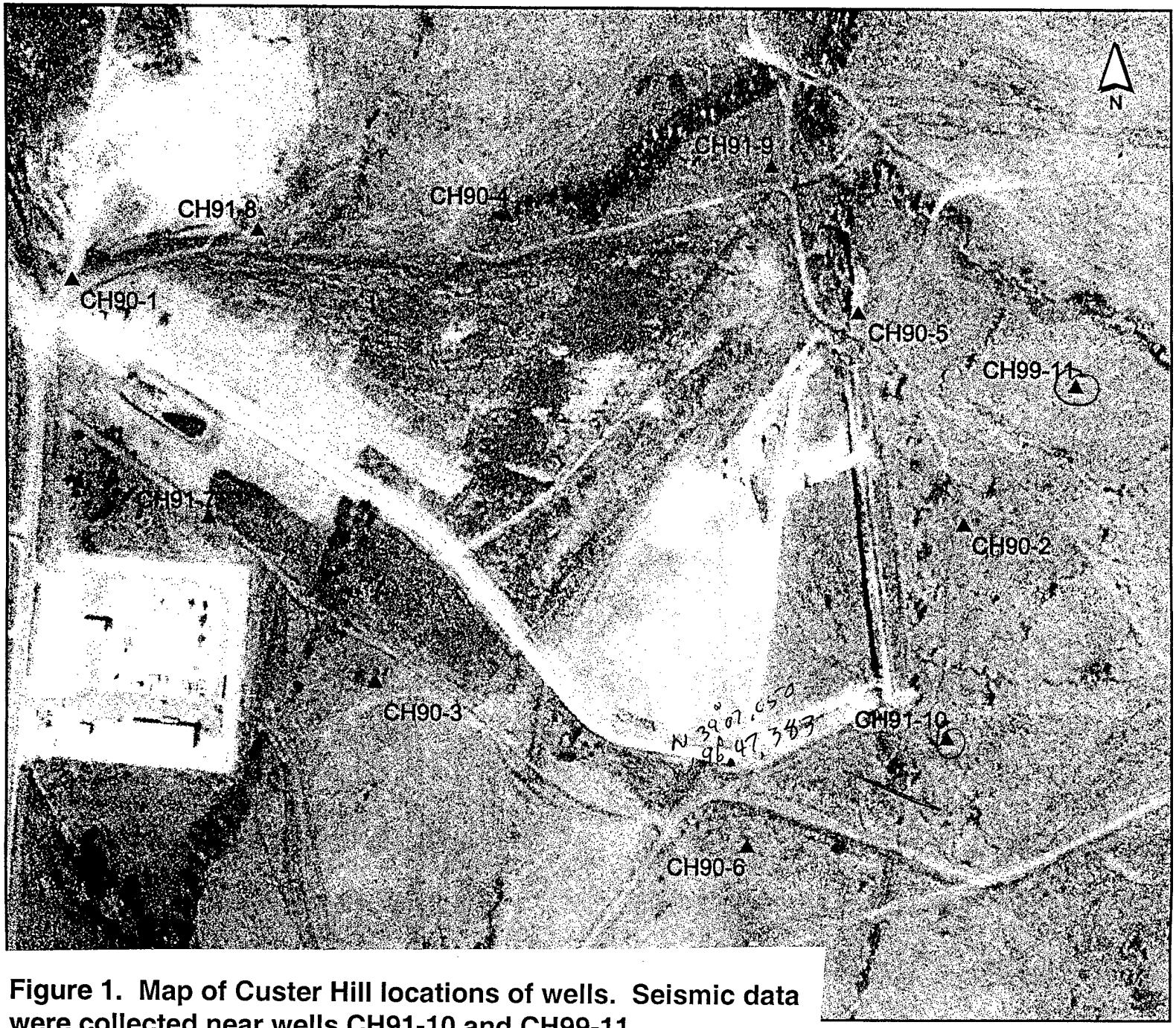
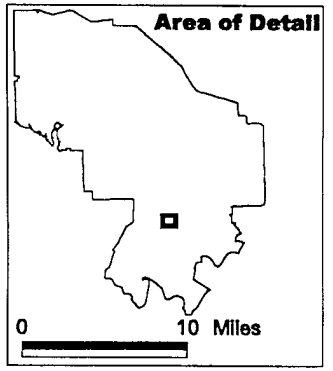


Figure 1. Map of Custer Hill locations of wells. Seismic data were collected near wells CH91-10 and CH99-11.

Background is 1992 Digital Orthophotography.

Custer Hill Landfill

Well Locations



Legend

▲ Wells

Scale

1:5000

0 200 400 600 Feet

0 50 100 150 Meters

DYNAMAC CORPORATION

Brian A. Higgins

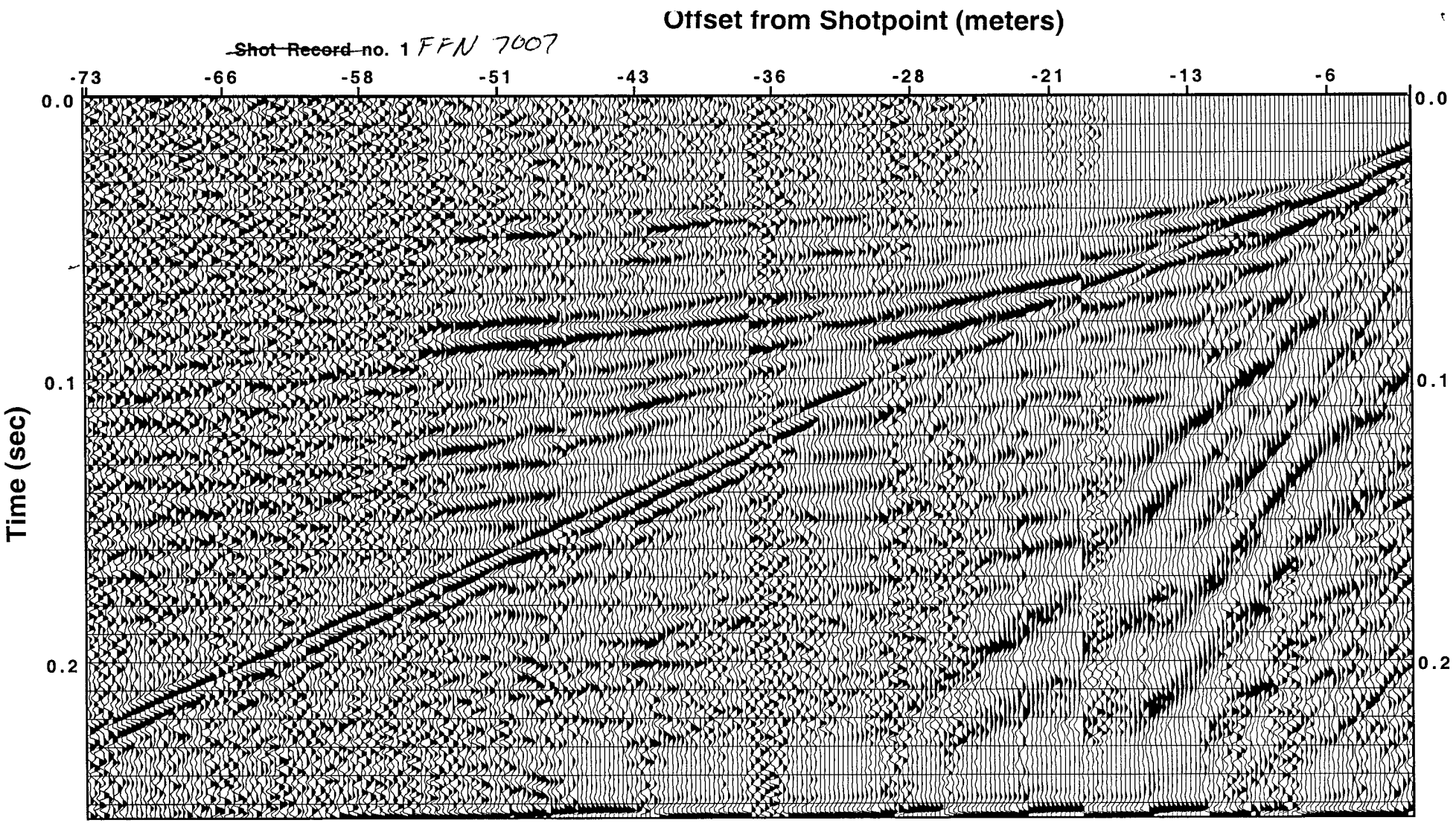


Figure 2. Seismic field records from well CH91-10. Source was a 30.06 rifle. Shots were progressively moved away from the geophones to provide a view of the total wavefield to a distance of 73 meters from the shotpoint. Geophone interval was 0.25 meter and digital sampling interval was 0.25 msec.

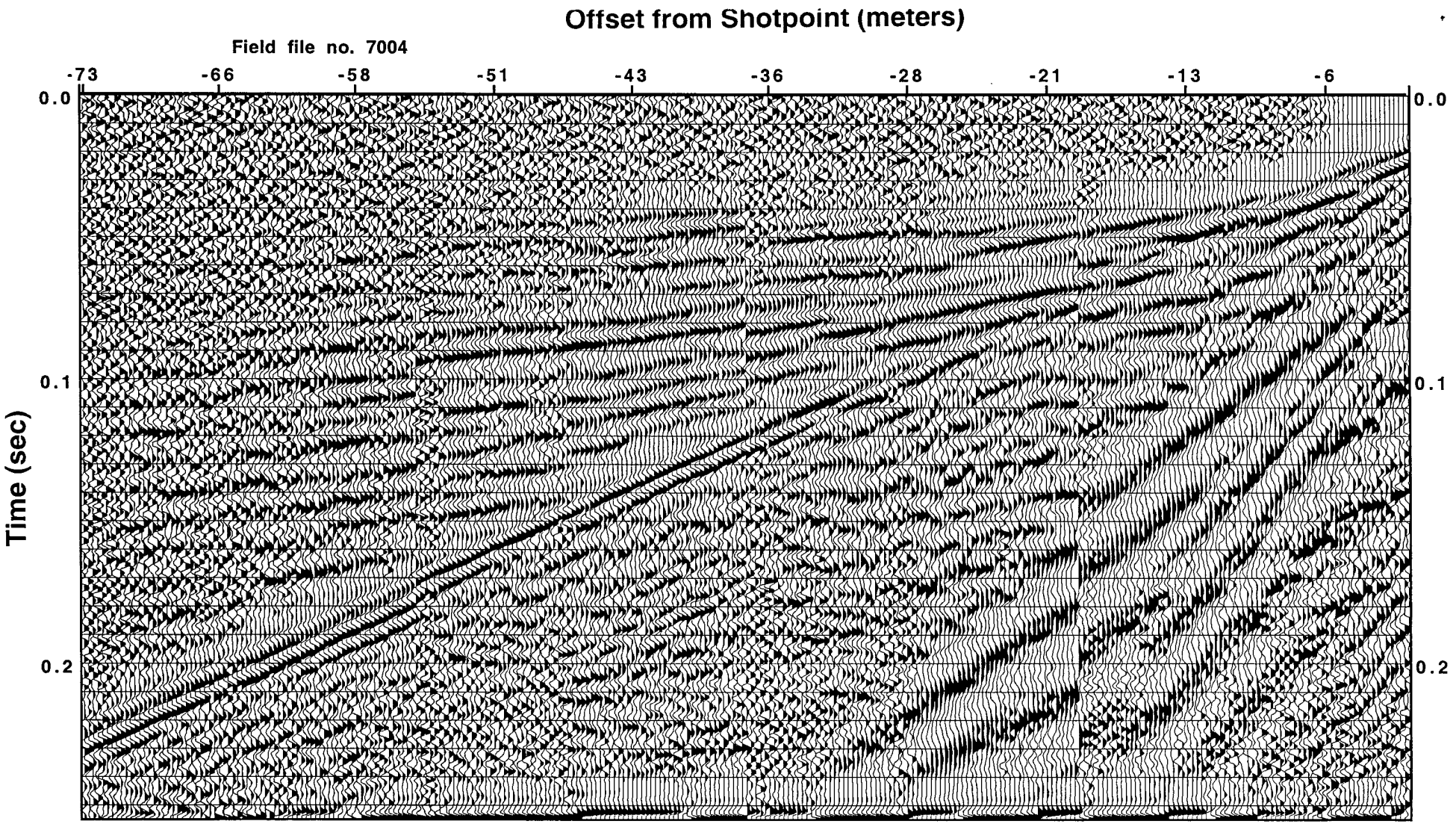


Figure 3. Seismic field records from well CH91-10. Source was a commercially available 8-gauge Betsy Seisgun. Shots were progressively moved away from the geophones to provide a view of the total wavefield to a distance of 73 meters from the shotpoint. Geophone interval was 0.25 meter and digital sampling interval was 0.25 msec.

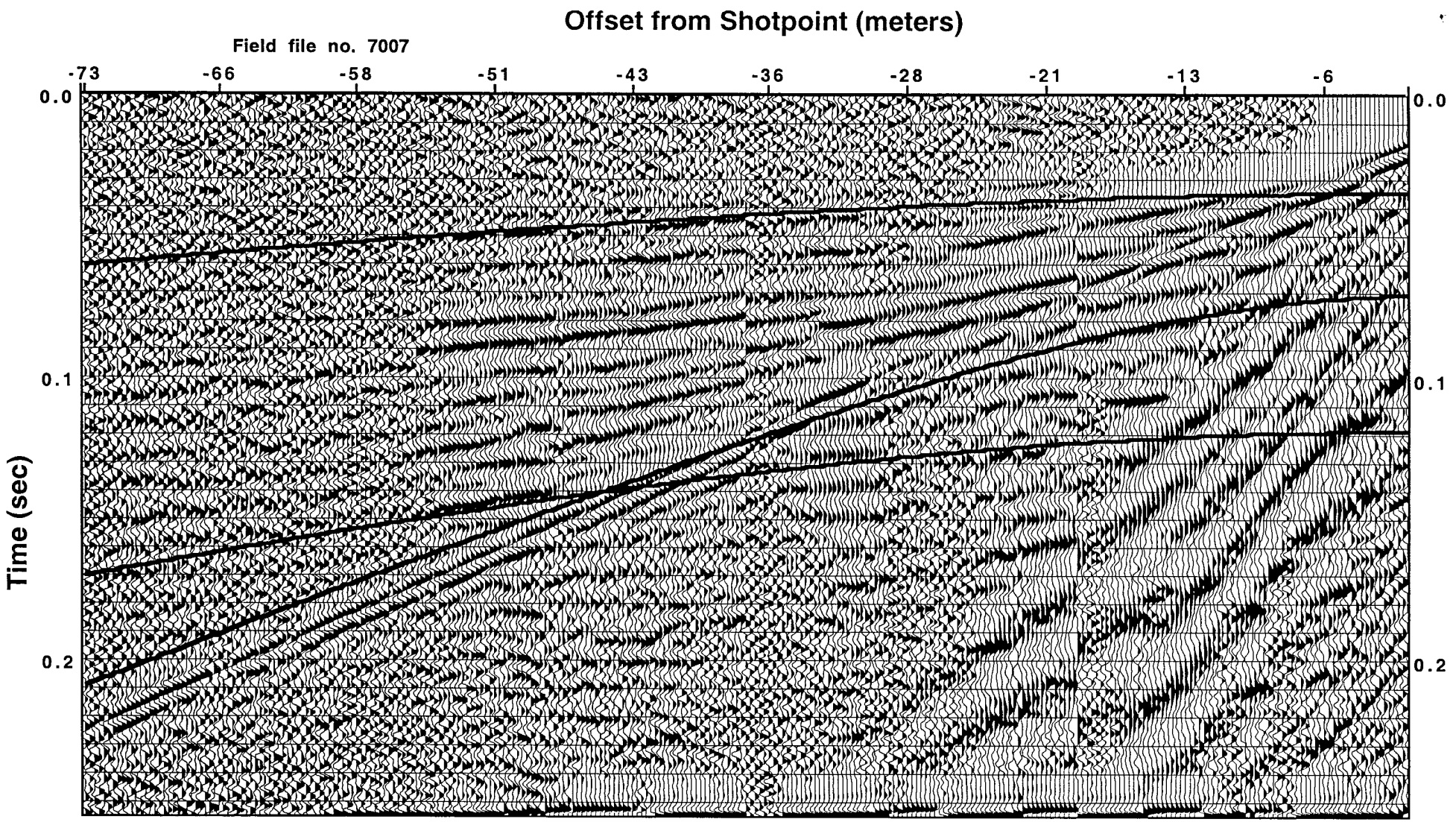


Figure 4. Expected seismic reflection times based on drill evidence are plotted on the data from Figure 2. No strong hints of reflections exist.

Shot Record No. 1 at Well No. CH99-11

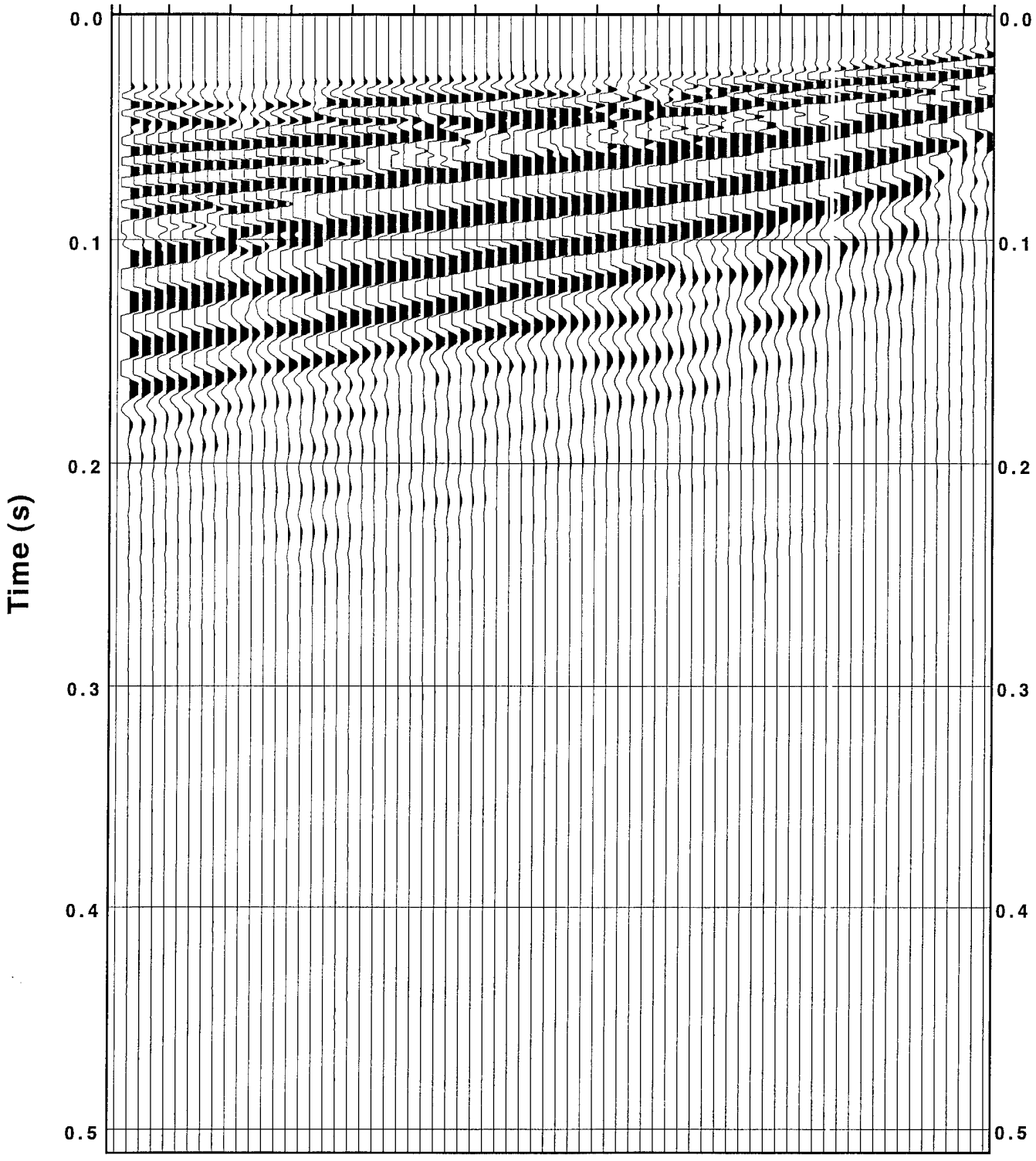


Figure 5. Field file from well CH99-11. Source distance to nearest geophone is 4 meters distance from farthest geophone is 21 meters. Source was a 30.06 rifle fired in a 0.3 meter deep hole.

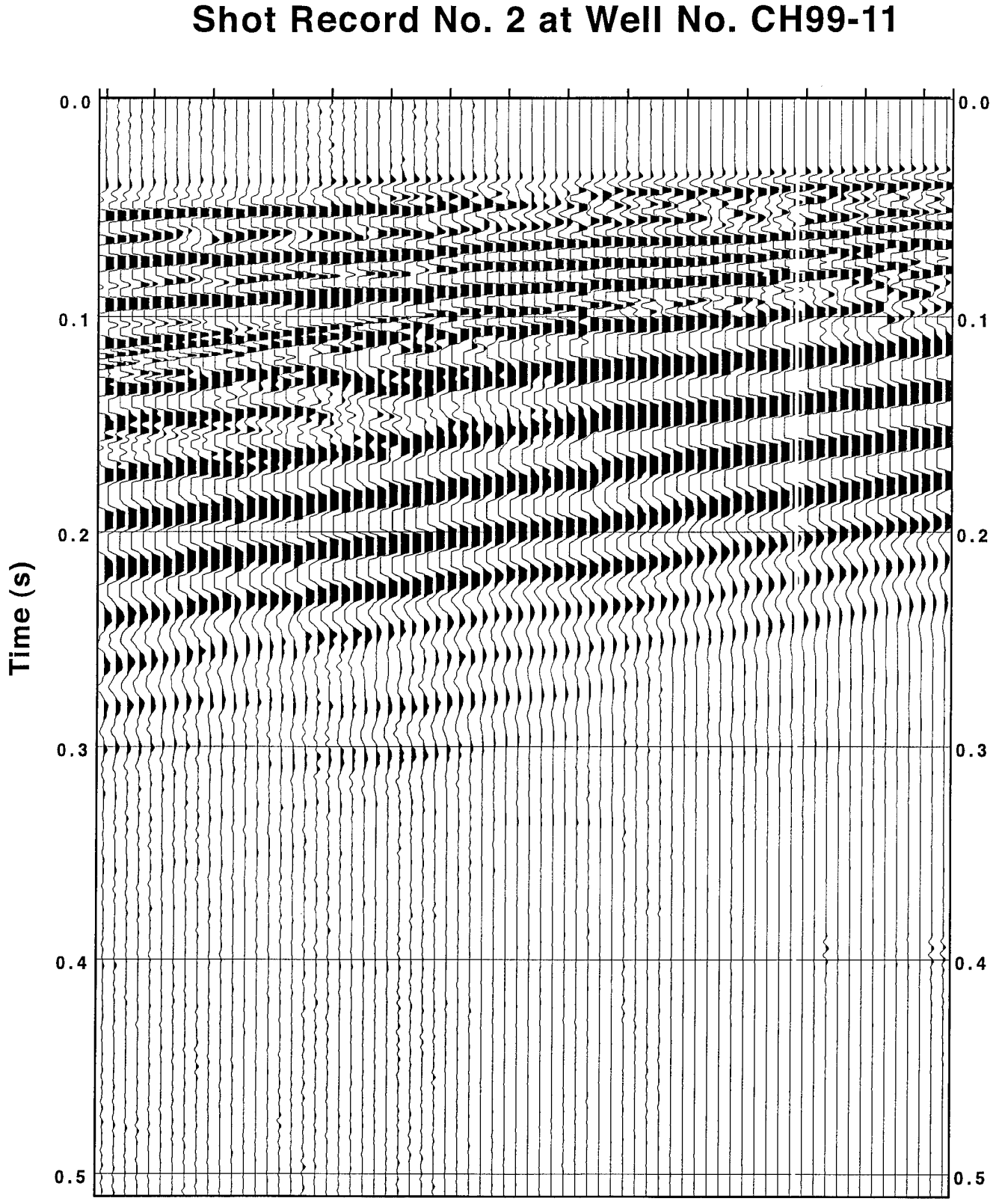


Figure 6. Field file from well CH99-11. Source distance to nearest geophone is 21.25 meters and distance from farthest geophone is 38 meters. Source was a 30.06 rifle fired in a 0.3 meter deep hole.

Shot Record No. 3 at Well No. CH99-11

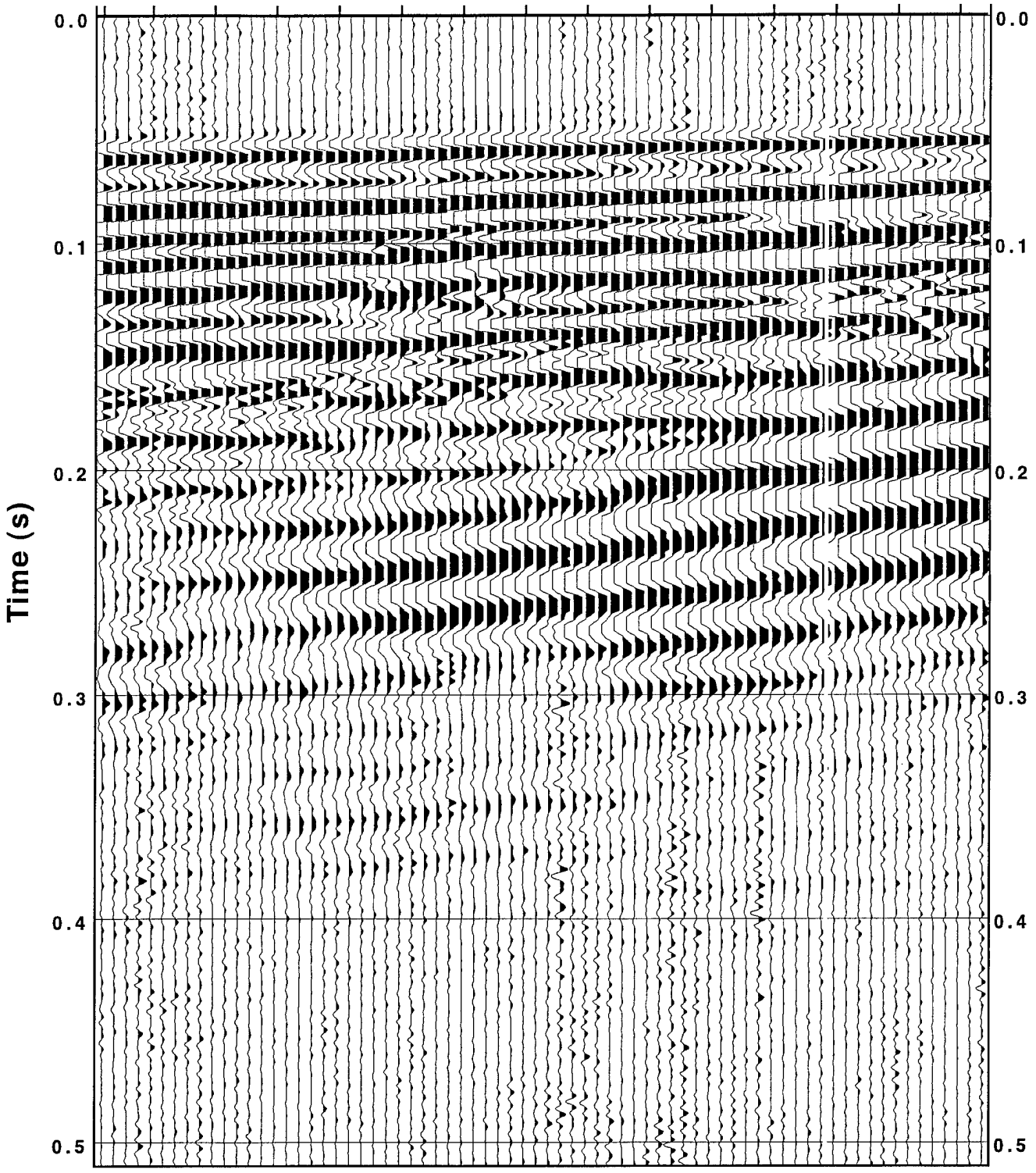
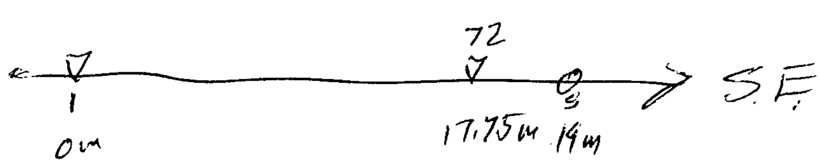


Figure 7. Field file from well CH99-11. Source distance to nearest geophone is 38.25 meters and distance from farthest geophone is 55 meters. Source was a 30.06 rifle fired in a 0.3 meter deep hole.

oct 14th

DATE: ~~Sept 26-27~~, 99	FILE #	Source Loc	1ST Rec Loc	LAST Rec Loc	COMMENTS
OBSERVER Schmeissner	7000	19m	0m	17.75m	Botsy 256ms
PROJECT ~~DOE~~ Walkaways	7001	19m			change 512ms rec
~~DOE grant, new site tests~~	7002	37m			
LOCATION ~~Great Bend, Ks.~~	7003	55m			
FT. Riley	7004	73m			
Well CH91-10	7005	90m	moved from 91 because of ditch		
SOURCE: ~~22 rifle shotts~~ Botsy	7006	90m			30.06
Interval: ~~0.1 meter~~ ~~0.25m~~	7007	73m			30.06
stack: no ~18m walkaway	7008	55m			
	7009	37m			
SEISMOGRAPH Geometrics	7010	19m			
Active channels ~~48~~ 72					
Filters out					
Sample interval 0.25 msec					
Other 256 ms					
GEOPHONES: Mark Prod					
Model L-40A freq ~~100 Hz~~ 28 Hz					
Interval ~~0.10 meter~~ 0.25m					
Spikes 5.5 in					
Other					
WEATHER CONDITIONS					
windy ~15mph					
SOIL CONDITIONS					
dry					
DATA DESCRIPTION					
Fair-poor					

Map/ Geometry Diagram



19
37
55
73
91